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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,490	10/26/2001	Kobby Pick	10559-454001/P10771	3410

20985 7590 04/27/2006

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EXAMINER	
PHU, PHUONG M	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 04/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/053,490	PICK ET AL.
	Examiner	**Art Unit**
	Phuong Phu	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *19-23* is/are allowed.

6)☒ Claim(s) *1,3-14,16-18,24,25,27 and 28* is/are rejected.

7)☒ Claim(s) *2,15 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal brief filed on 2/21/06, PROSECUTION IS HEREBY REOPENED. Accordingly, a non-final Office Action is set forth below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-14, 16-18, 24, 25, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al (2002/0181624), (previously cited), in view of Sriram et al (6,754,251), (previously cited), and Sklar, "Digital Communications Fundamentals and Applications", pages 21-22, (newly-cited).

-Regarding to claim 1, see figure 2 and sections [0021-0048], Gonzalez et al discloses a method comprising:

step (12, 14, 16) of determining a normalization factor (outputted from (14)); and

step (16) of applying the normalization factor to an output (y) of a receiver (10).

Gonzalez et al does not disclose determining the normalization factor by using a determined variance of a multiple access interference, as claimed.

However, Gonzalez et al teach that the normalization factor is determined by being based on an interference variance (σ^2) of interference/noise occurred at a receiver (see [0030]), that the interference/noise can be modeled as additive white Gaussian noise, and the interference variance (σ^2) is, therefore, the variance of additive white Gaussian noise (see [0005-0006)]; and

Gonzalez et al further teaches that the method can be employed in CDMA (code-division-multiple-access) receivers (see [0004,0007]). Gonzalez et al does not teach in detail how the interference/noise is obtained in order to model it as the additive white Gaussian noise, and therefore, does not teach in detail how the interference variance of the interference/noise is obtained.

Sriram et al teaches that a signal being received at a CDMA receiver of a CDMA communication system might be subjected to interference which is caused by thermal noise, inter and intra-cell interference, and cross correlation among different PN sequences of the CDMA system (namely, multiple access interference), and/or correlation between a PN code and its random shifts, wherein the cross correlation among different PN sequences of the CDMA system (or namely, multiple access interference) can be modeled as a random variable "additive Gaussian noise" (see col. 17, lines 49-51, col. 18, lines 7-18 and col. 18, lines 34-37).

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, (where multiple access interference, caused by different PN sequences of the CDMA system, is occurred), it would have been obvious for one skilled in the art to implement Gonzalez et al CDMA receiver to obtain cross correlation among different PN sequences of the CDMA system as the multiple access interference, as taught by Sriram et al, so that with such the implementation, the multiple access interference, caused by different PN sequences of the CDMA system, would be obtained so that it can be modeled as an additive white Gaussian noise in order for determining the variance of the multiple access interference as the interference variance (σ^2) of interference/noise or a part of the interference/noise occurred at the receiver.

Gonzalez et al in view of Sriram et al does not teach in detail how the variance of the multiple access interference (cross correlation among different PN sequences) is determined.

Sklar teaches that the variance of a random variable X is determined as the difference between the mean-square value of the random variable X and the square of the mean of the random variable X (see page 21 and 22).

It would have been obvious for one skilled in the art to implement Gonzalez et al in view of Sriram et al to determine the variance of the multiple access interference (cross correlation among different PN sequences) as the difference between the mean-square value of the cross correlation among different PN sequences and the square of the mean of the cross correlation among different PN sequences, as taught by Sklar, so that with such the implementation, the interference variance (σ^2) would be determined.

Therefore, with such the above implementations, Gonzalez et al in view of Sriram et al and Sklar teaches determining the normalization factor by using a determined variance of a multiple access interference, as claimed.

-Regarding to claim 3, Gonzalez et al discloses step (16, 18) of obtaining a metric correction factor (outputted from (18)) using the normalization factor (see figure 2).

-Regarding to claim 4, Gonzalez et al discloses step (18) of providing the metric correction factor to a channel decoder (20) (see figure 2 and section [0048]).

-Regarding to claim 8, Gonzalez et al discloses that the receiver employing a detection (demodulator) to obtain the output of the receiver for CDMA communications (see figure 2), (note that this detection is accounted for the claimed limitation "multi-user detection").

-Regarding to claim 9, see figure 2 and sections [0021-0048], Gonzalez et al discloses a system comprising:

a detector (demodulator, 10) which receives transmitted information and provides one or more output symbols based on the transmitted information;

a metric correction section (12, 14, 16, 18) which normalizes the one or more output symbols to obtain a metric (outputted from (12)); and

a channel decoder(18, 20) which receives the metric from the metric correction section, the channel decoder utilizing the metric to decode the transmitted information (see figure 2 and section [0048]).

Gonzalez et al does not disclose the normalization is carried out by basing on a variance of a multiple access interference.

However, Gonzalez et al teach that the normalization is determined by being based on an interference variance (σ^2) of interference/noise occurred at a receiver (see [0030]), that the interference/noise can be modeled as additive white Gaussian noise, and the interference variance (σ^2) is, therefore, the variance of additive white Gaussian noise (see [0005-0006)]; and Gonzalez et al further teaches that the method can be employed in CDMA (code-division-multiple-access) receivers (see [0004,0007]). Gonzalez et al does not teach in detail how the interference/noise is obtained in order to model it as the additive white Gaussian noise, and therefore, does not teach in detail how the interference variance of the interference/noise is obtained.

Sriram et al teaches that a signal being received at a CDMA receiver of a CDMA communication system might be subjected to interference which is caused by thermal noise,

inter and intra-cell interference, and cross correlation among different PN sequences of the CDMA system (namely, multiple access interference), and/or correlation between a PN code and its random shifts, wherein the cross correlation among different PN sequences of the CDMA system (or namely, multiple access interference) can be modeled as a random variable "additive Gaussian noise" (see col. 17, lines 49-51, col. 18, lines 7-18 and col. 18, lines 34-37).

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, (where multiple access interference, caused by different PN sequences of the CDMA system, is occurred), it would have been obvious for one skilled in the art to implement Gonzalez et al CDMA receiver to obtain cross correlation among different PN sequences of the CDMA system as the multiple access interference, as taught by Sriram et al, so that with such the implementation, the multiple access interference, caused by different PN sequences of the CDMA system, would be obtained so that it can be modeled as an additive white Gaussian noise in order for determining the variance of the multiple access interference as the interference variance (σ^2) of interference/noise or a part of the interference/noise occurred at the receiver.

Gonzalez et al in view of Sriram et al does not teach in detail how the variance of the multiple access interference (cross correlation among different PN sequences) is determined.

Sklar teaches that the variance of a random variable X is determined as the difference between the mean-square value of the random variable X and the square of the mean of the random variable X (see page 21 and 22).

It would have been obvious for one skilled in the art to implement Gonzalez et al in view of Sriram et al to determine the variance of the multiple access interference (cross correlation

among different PN sequences) as the difference between the mean-square value of the cross correlation among different PN sequences and the square of the mean of the cross correlation among different PN sequences, as taught by Sklar, so that with such the implementation, the interference variance (σ^2) would be determined.

Therefore, with such the above implementations, Gonzalez et al in view of Sriram et al and Sklar teaches the normalization is determinebased on a determined variance of a multiple access interference, as claimed.

-Regarding to claims 10, 11 and 14, in Gonzalez et al, the detector can be configured to obtain the output of the receiver for CDMA communications by using plural of processing paths (see figure 2, [0004, 0005]), (note that this detector is accounted for the claimed limitations "multi-user detector" of claim 10, "rake detector" of claim 11, and "long code CDMA detector" of claim 14).

-Regarding to claim 12, Gonzalez et al discloses that the metric is based on a ratio (see equation 6), (note that this ratio is accounted for the claimed limitation "log likelihood ratio").

-Regarding to claim 13, Gonzalez et al discloses that the metric correction section comprises means (14, 16) which determines a normalization factor (outputted from (14) to apply to the output symbols of the detector (see figure 2).

-Regarding to claims 5, 16, Gonzalez et al discloses step/means (12) determining LLR $\lambda(y)$, as the LLR(n) as claimed (see section [0030] and equation (6)) wherein:

$\lambda(y) = (2a^*y)/\sigma^2$, where

y is the detected output of an input symbol being demodulated by demodulator to provide the detected output (see figure 2),

a or a* is a time varying gain "channel gain" associated with a symbol y (see figure 2, [0005, 0006], (which is considered here equivalent with the limitation "time varying gain associated with the desired symbol"), and

σ^2 is noise variance, (which is considered here equivalent with the limitation "total noise variance").

-Regarding to claims 6, 7, 17, 18, Gonzalez et al, in view of Sriram et al and Sklar, discloses step/means of determining the variance of multiple access interference (see Sriram et al, col. 18, lines 16-19), (note that each of the claimed limitations "determining the variance of multiple access interference analytically" of claim 6, and "determining the variance of multiple access interference empirically" of claim 7 is given here a broad meaning as "determining the variance of multiple access interference , and each of the claimed limitations "the variance of the multiple access interference is determined analytically" of claim 17 and limitations "the variance of the multiple access interference is determined empirically" of claim 18 is given here a broad meaning as "the variance of the multiple access interference is determined").

-Regarding to claim 24, see figure 2 and sections [0021-0048], Gonzalez et al discloses a method comprising:

step (10) of receiving an symbol;

step (12, 14) of determining a normalization factor for the symbol;

step (16) of normalizing the symbol with the normalization factor; and

step (18, 20) of providing the normalized symbol to a channel decoder (20).

Gonzalez et al does not disclose the normalization factor is determined by using a variance of a level of multiple access interference for the symbol, as claimed, (note that the

claimed limitation "determining a normalization factor for the symbol using a determined variance in a level of multiple access interference for the symbol" is interpreted here as "determining a normalization factor for the symbol using a determined variance of multiple access interference for the symbol").

However, Gonzalez et al teach that the normalization factor is determined by being based on an interference variance (σ^2) of interference/noise occurred at a receiver (see [0030]), that the interference/noise can be modeled as additive white Gaussian noise, and the interference variance (σ^2) is, therefore, the variance of additive white Gaussian noise (see [0005-0006)]; and Gonzalez et al further teaches that the method can be employed in CDMA (code-division-multiple-access) receivers (see [0004,0007]). Gonzalez et al does not teach in detail how the interference/noise is obtained in order to model it as the additive white Gaussian noise, and therefore, does not teach in detail how the interference variance of the interference/noise is obtained.

Sriram et al teaches that a signal being received at a CDMA receiver of a CDMA communication system might be subjected to interference which is caused by thermal noise, inter and intra-cell interference, and cross correlation among different PN sequences of the CDMA system (namely, multiple access interference), and/or correlation between a PN code and its random shifts, wherein the cross correlation among different PN sequences of the CDMA system (or namely, multiple access interference) can be modeled as a random variable "additive Gaussian noise" (see col. 17, lines 49-51, col. 18, lines 7-18 and col. 18, lines 34-37).

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, (where multiple access interference, caused by different PN sequences of the CDMA system, is

occurred), it would have been obvious for one skilled in the art to implement Gonzalez et al CDMA receiver to obtain cross correlation among different PN sequences of the CDMA system as the multiple access interference, as taught by Sriram et al, so that with such the implementation, the multiple access interference, caused by different PN sequences of the CDMA system, would be obtained so that it can be modeled as an additive white Gaussian noise in order for determining the variance of the multiple access interference as the interference variance (σ^2) of interference/noise or a part of the interference/noise occurred at the receiver.

Gonzalez et al in view of Sriram et al does not teach in detail how the variance of the multiple access interference (cross correlation among different PN sequences) is determined.

Sklar teaches that the variance of a random variable X is determined as the difference between the mean-square value of the random variable X and the square of the mean of the random variable X (see page 21 and 22).

It would have been obvious for one skilled in the art to implement Gonzalez et al in view of Sriram et al to determine the variance of the multiple access interference (cross correlation among different PN sequences) as the difference between the mean-square value of the cross correlation among different PN sequences and the square of the mean of the cross correlation among different PN sequences, as taught by Sklar, so that with such the implementation, the interference variance (σ^2) would be determined.

Therefore, with such the above implementations, Gonzalez et al in view of Sriram et al and Sklar teaches determining the normalization factor by using a determined variance of a multiple access interference, as claimed.

-Regarding to claim 25, Gonzalez et al in view Sriram et al and Sklar discloses step of determining a time varying gain (outputted from (14) associated with a desired symbol (see Gonzalez et al, figure 2); and step (12) of determining the variance in the level multiple access interference for the symbol (see Gonzalez et al, figure 2, as being applied to claim 24 of being in view of Sriram et al and Sklar).

-Regarding to claim 27, Gonzalez et al discloses that normalizing the symbol with the normalization factor comprises step (16) multiplying the symbol (outputted from (10) by a log likelihood ratio (outputted from (12, 14) (see figure 2).

-Claim 28 is rejected with similar reasons set forth for claims 5 and 16.

Allowable Subject Matter

4. Claims 19-23 are allowed.

5. Claims 2, 15 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed on 2/21/06 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phuong Phu
Primary Examiner
Art Unit 2611

PHUONG PHU
PRIMARY EXAMINER

Phuong Phu

Phuong Phu
04/24/06